

A JOINT CONCEPT FOR NON-LETHAL WEAPONS

INTRODUCTION

PURPOSE

This joint concept paper provides direction for the Department of Defense non-lethal weapons program. It does so by establishing a set of guiding principles for the development of non-lethal weapons core capabilities for application across the spectrum of military operations. This concept paper will serve as:

- W the foundation for decisions impacting joint capability development
- W a point of departure for experimentation and development
- W the common frame of reference for development of relevant doctrine, including tactics, techniques, and procedures.

The scope of this paper is necessarily broad. It addresses all activities and considerations that apply to the development of non-lethal weapons requirements, capabilities, and procedures. These considerations are not restricted to operational matters. They also include policy issues, including some matters relevant to the decision to use military force in the furtherance of national interests.

By their nature, concept papers examine *ideas*. It may be possible to develop some of these ideas into practical capabilities in the near term. Other ideas may challenge conventional notions and would require much more time to produce useful capabilities. Concepts are not bound by limiting criteria like fiscal constraints or our present level of scientific *knowledge*. Rather, they are bound only by the limits of *possibility*—as expressed by the immutable laws of sciences like physics, chemistry, or biology.

This paper derives from *Joint Vision 2010*. By pursuing "the ability to produce a broader range of potential weapons effects," it directly supports the operational concept of *full dimensional protection*. It identifies required operational capabilities that will allow commanders to accomplish assigned

missions while simultaneously reducing the adverse effects of military operations, especially collateral damage.

Using a hypothetical scenario and a number of vignettes, Annex A explores some possible applications of non-lethal capabilities.

DEFINING NON-LETHAL WEAPONS

Department of Defense policy defines non-lethal weapons as "weapon systems that are explicitly designed and primarily employed so as to incapacitate personnel or materiel, while minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment." This definition does not include information warfare, electronic warfare, or any other military capability not designed *specifically* for the purpose of minimizing fatalities, permanent injury to personnel, and undesired damage to property and the environment, even though these capabilities may have non-lethal effects.

It is important to note that Department of Defense policy does *not* require or expect non-lethal weapons "to have a zero probability of producing fatalities or permanent injuries." Rather, non-lethal weapons are intended to *significantly reduce* the probability of such fatalities or injuries as compared with traditional military weapons which achieve their effects through the physical destruction of targets.

THE ENVIRONMENT

Increased interaction between friendly troops and friendly, neutral, or hostile civilian populations has become a feature of the contemporary operational landscape. This is likely to remain the case for the foreseeable future. Two factors account for this development. First, worldwide patterns of population growth and migration have resulted in increased urbanization, not only within the established industrialized states, but also in many undeveloped and developing societies. The urbanization of many crisis-prone regions of the world creates the potential for large, vulnerable groups of noncombatants to be caught up in military confrontations involving U.S. forces.

Second, U.S. forces increasingly operate in the challenging

environment known as military operations other than war. This category of operations includes such missions as humanitarian assistance, military support to civil authorities, peace operations, and noncombatant evacuations. These operations commonly involve close and continual interaction between friendly forces and noncombatant civilians. Some military operations other than war scenarios include the presence of paramilitary forces or armed factions which present a real but ill-defined threat. In these situations, the mission of military forces commonly has aspects that are *preventive* in nature. That is, military forces accomplish their mission by preventing individuals or groups from carrying on undesirable activities such as rioting and looting or attacking, harassing, and otherwise threatening opponents. Sometimes, hostile elements blend in with the local population of uninvolved citizens. Other times, sectors of the local population may rise against our forces and become active participants in acts of violence. Factional alignments, the level of violence, and the threat to mission accomplishment may change frequently and with little or no warning. Under such circumstances, the identity of our opponents is uncertain, and the use of deadly force for purposes other than self-defense may be constrained by rules of engagement or by the judgment of the commander on the scene.

U.S. military forces conduct operations in a manner consistent with treaties, international law, and U.S. policy. The constraints on U.S. military action are based on the principles of *proportionality* and *necessity*. These principles reflect our desires to minimize noncombatant casualties and collateral damage and to preserve the perceived legitimacy of our operations. Despite our best efforts, however, we are not always able to eliminate the possibility of noncombatant casualties without placing friendly forces or mission accomplishment at risk. When such noncombatant casualties occur—even as the unavoidable result of actions taken under clear military necessity—they are immediately and graphically reported worldwide by networked media organizations. Such reporting often creates considerable local, international, or domestic U.S. opposition to the continued presence of U.S. forces in the area of crisis. This can result in the loss of perceived legitimacy and severely limit the utility of military force as a policy option in the furtherance of national interests. Clever opponents are quick to recognize these constraints and will seek to turn the situation to their own advantage.

Traditional military weapons require commanders to make difficult "trade off" decisions regarding the proper balance

between mission accomplishment, force protection, and the safety of noncombatants. We may relax the rules of engagement in order to enhance mission accomplishment or force protection through increased freedom in the application of firepower, but this potentially decreases the safety of noncombatants. Conversely, when we increase the safety of noncombatants through restrictions on the use of firepower, our troops become potentially more vulnerable and their mission more difficult to achieve.

Non-lethal weapons expand the number of options available to commanders confronting situations in which the use of deadly force poses problems. They provide flexibility by allowing U.S. forces to apply measured military force with reduced risk of serious noncombatant casualties, but still in such a manner as to provide force protection and effect compliance. Because we can employ non-lethal weapons at a lower threshold of danger, commanders can respond to an evolving threat situation more rapidly. This allows U.S. forces to retain the initiative and reduce their own vulnerability. Thus, a robust non-lethal capability will assist in bringing into balance the conflicting requirements of mission accomplishment, force protection, and safety of noncombatants. It will therefore enhance the utility and relevance of military force as a U.S. policy option in an increasingly complex and chaotic international environment.

GUIDING PRINCIPLES

The guiding principles discussed in the following subsections are intended to ensure common direction, focused effort, and efficient use of resources in the development of U.S. non-lethal capabilities. These principles apply to many aspects of non-lethal weapons, including desired weapons characteristics and policies for their employment. As *guidelines*, they are not exclusive. Neither are they designed to create restrictions on the rights and responsibilities of U.S. forces regarding self-defense. Rather, they are key considerations in the future development of non-lethal weapons requirements and capabilities in the areas of equipment, doctrine, organization, training, leader development, and support.

LEVERAGE HIGH TECHNOLOGY

Technologies with a potential for generating non-lethal military capabilities cover a very broad spectrum. At the "low" end of

this spectrum are capabilities which have been in use for many years with varying degrees of success. These include riot batons, pepper spray, and rubber bullets. Their advantage is simplicity. Their disadvantages are their lack of "standoff" capability and their applicability only to limited scenarios like hand-to-hand confrontations and riot control.

The exploitation of advanced technologies with potential non-lethal weapons applicability calls for innovative, creative thinking. The Department of Defense non-lethal weapons approach must encourage the pursuit of nontraditional concepts. Our experimental and developmental approaches must be bound only by the limits of physical *possibility*. Otherwise, we impose artificial and unnecessary limits on our thinking and thus on the potential utility of non-lethal systems. Electronic, acoustic, and nanotechnological approaches, among others, may offer high-payoff avenues of investigation and application.

ENHANCE OPERATIONS

The goal of creating new capabilities is a net improvement in readiness or performance. As with any capability based upon advanced technology, the potential exists for non-lethal weapons to generate costs (measured in terms of a tactical commander's ability to employ resources) that outweigh their benefits. Non-lethal weapons must not create undue burdens. Rather, they should enhance the commander's ability to accomplish assigned missions. This theme — enhance operations — is central to every decision involving the development, evaluation, procurement, deployment, and employment of non-lethal weapons. It is at the core of our entire set of guiding principles.

Non-lethal weapons must provide commanders an adaptable and reliable capability to influence the tactical situation. They should be effective at distances commensurate with mission requirements so that commanders can apply non-lethal force over the entire battlespace. Non-lethal weapons should not be easily defeated by countermeasures. However, the fielding of capabilities that are vulnerable to some countermeasures may be justified if the benefits of a single opportunity to use the capability in a given context would be so great as to outweigh that disadvantage.

In all cases, non-lethal weapons must be compatible with, easily integrated with, and complementary to current and planned conventional weapons systems. In seeking to enhance operations,

rather than burden commanders and troops, the Department of Defense non-lethal weapons program will address the potential impact of non-lethal weapons upon readiness. First, at the tactical level, this means that non-lethal weapons, like conventional weapons, must achieve the desired effects on targets instantaneously, or as close thereto as practicable, without adversely affecting friendly forces. Non-lethal weapons designed to be carried and employed at the *individual* level must require an *absolute minimum* of additional hardware and a minimal increase in equipment load. They should be designed for simplicity of operation and maintenance. We prefer that non-lethal effects be delivered by existing launchers and weapons systems. Larger standalone non-lethal systems should be optimized for ease of mounting on existing vehicles or general purpose aircraft without extensive modifications. If non-lethal capabilities require modification of existing weapons systems, these modifications must not in any way reduce the capability of those systems to fire lethal munitions.

Second, at the organizational level, we must minimize impacts on the personnel system. Non-lethal systems must generate only very limited requirements for new military occupational specialties or new organizations dedicated to their operation or maintenance. Similarly, the use and maintenance of non-lethal weapons should not require field commanders to significantly alter the organization of their units or to dedicate a significant percentage of the unit's assets to those purposes.

Third, non-lethal weapons training must be of such a nature as to be readily integrated into other individual and unit training events. Non-lethal weapons and tactics should be designed for ease of use after brief individual- and unit-level training that does not seriously distract units from other training tasks. Unavoidably, more complex systems may require a significant investment in operator training, but this will be limited to small numbers of key personnel. Weapons and ammunition must be available for live-fire training and must be compatible with the safety requirements and limitations in effect on most live-fire ranges. Non-lethal training aids or devices should provide realistic and effective training, to include applications for use in force-on-force exercises.

Fourth, non-lethal weapons maintenance requirements should be reasonably compatible with those for other items of equipment. Individual and organizational maintenance support procedures should not require extraordinary arrangements or the introduction of a large quantity of system-specific test and

repair equipment.

AUGMENT DEADLY FORCE

The commitment of military power to resolve crises has traditionally involved either the *use of deadly force* or the implicit or explicit *threat* of the use of deadly force. Military units are primarily trained, organized, and equipped for these purposes. A force armed only with traditional military weapons normally has only two options for effecting compliance: maintaining a *presence* (essentially a threat) or actually employing deadly force. These two options are extremes with no middle ground. Our reluctance to impose our will through the use of lethal weapons creates a critical vulnerability which our adversaries quickly discern. Non-lethal weapons provide commanders a more extensive continuum of options. The wider range of choices which fall between the extremes of presence and deadly force gives commanders the flexibility to act appropriately in executing a mission when circumstances may limit the use of lethal means. Through this capability, non-lethal weapons will support the National Military Strategy by providing means for *flexible and selective engagement*.

The wider range of options provided by non-lethal capabilities *augments* deadly force but *does not replace it*. Deadly force must always remain available to the commander when the situation demands it. The Department of Defense Policy Directive concerning non-lethal weapons states that "the availability of non-lethal weapons will not limit a commander's inherent authority and obligation to use all necessary means available and to take all appropriate action in self-defense." The existence of non-lethal capabilities therefore does *not* represent the potential for "non-lethal warfare" or "non-lethal operations." Unrealistic expectations to that effect must be rigorously avoided. Noncombatant casualties, to include serious injuries and fatalities, will continue to be a *regrettable but unavoidable* outcome when military power is employed, whether or not non-lethal weapons are available. Non-lethal weapons simply add flexibility to combat operations and enhance force protection by providing an environment in which friendly troops can engage threatening targets with limited risk of noncombatant casualties and collateral damage.

This principle—augment deadly force—is fundamental to the planning and execution of any operation in which the employment of non-lethal capabilities is contemplated. First, rules of

engagement must be clearly articulated and understood to establish the role of non-lethal weapons as an *additional* means of employing force for the particular purpose of limiting the probability of death or serious injury to noncombatants—or, in some circumstances, to enemy combatants. The capability to resort to deadly force must always remain an inherent right of individuals in instances of self-defense, as well as an inherent responsibility of commanders when the mission and the circumstances warrant it.

Second, commanders and public affairs officers must prepare personnel to address media questions and explain the purpose of non-lethal weapons. Operational experience indicates that novel capabilities provoke significant media interest. Personnel participating in interviews or briefings must be prepared to address the role of non-lethal weapons in such a manner as to provide a clear understanding that the presence of a non-lethal capability in no way abrogates the option to employ deadly force in appropriate circumstances. This stance is necessary both to deter potential adversaries and to avoid misperceptions by the news media.

PROVIDE "RHEOSTATIC" CAPABILITY

For non-lethal weapons to realize their fullest potential, they must be capable of delivering varying levels of effects. This characteristic—a "rheostatic" or "tunable" quality—will allow commanders to increase or decrease the degree of influence used to effect compliance. A rheostatic capability provides the range of effects necessary to achieve a complete "continuum of force." It is not necessary that *individual* non-lethal weapons possess rheostatic characteristics (though this may be useful), only that the family of non-lethal weapons as a *whole* provide this capability.

FOCUS ON TACTICAL APPLICATIONS

While non-lethal weapons have widespread applicability, Department of Defense non-lethal weapons programs will *focus* efforts on those weapons and systems designed primarily for employment at the *tactical* level. This distinction does not preclude the use of non-lethal weapons to achieve operational and strategic objectives when circumstances warrant. Its purpose is to establish direction by focusing developmental efforts on the pursuit of *tactical* capabilities.

The tactical level of war is the realm of engagements and battles. For purposes of this concept, it is assumed here that the tactical level of war includes the actions and decisions taken by the commander of a joint task force and his subordinate commanders. It is at this level of war that troops are most frequently confronted with situations in which it is difficult to differentiate between the enemy and noncombatants. The leaders who must make immediate decisions in these difficult situations are often very junior. These are the circumstances in which non-lethal weapons offer the greatest potential utility. Department of Defense non-lethal weapons programs will therefore achieve the greatest benefits by focusing developmental and acquisition efforts on tactical applications.

FACILITATE EXPEDITIONARY OPERATIONS

U.S. forces stand ready to defend national interests through their capability to rapidly project military power to theaters of operations anywhere in the world. Forces optimized for such rapid deployment, operating under the constraints of limited strategic lift, require combat capabilities with *expeditionary characteristics*. "Expeditionary character" includes a number of qualities which define the ability to deploy and carry out combat operations on short notice and to continue those operations indefinitely in austere environments. These qualities include mobility, endurance, and sustainability.

To remain relevant and of value to commanders in the field, non-lethal weapons must be mobile: able to reach the scene of the action in a timely manner and without creating major logistic difficulties or forcing complex cost-benefit analyses and "trade off" decisions. *Strategic* mobility calls for a small "footprint," which reduces the burden placed upon strategic lift assets. *Operational* mobility requires the ability to rapidly shift within a theater of operations. *Tactical* mobility requires ease of transport at the using-unit level without overburdening organic assets or personnel. The common theme is that *commanders must be able to deploy and employ non-lethal systems without sacrificing other critical offensive and defensive capabilities and options*. In all cases, mobility requires not only mobile weapons and delivery systems, but also easily transportable ammunition and support equipment.

The quality of "endurance" calls for robust non-lethal capabilities. Non-lethal weapons systems must be designed to

ensure reliability under the rigors of field employment in the most austere conditions and in extremes of climate. Associated support equipment must be as durable as the weapons systems themselves.

Ease of sustainment is critical. Routine preventive and corrective maintenance of non-lethal capabilities must be practical without resort to evacuation of equipment from the theater of operations. Expendable munitions must have a long shelf life. They must be stable, compatible with other munitions for purposes of storage and transport, and easily transportable by unmodified tactical vehicles and aircraft using normal ammunition handling procedures.

MAINTAIN POLICY ACCEPTABILITY

Non-lethal weapons, many of which employ relatively new technologies, have not been fully tested in war or military operations other than war. Consequently, such weapons have not been subjected to the same level of scrutiny as have most other families of weapons in our inventory. Some proposed non-lethal weapons may be forbidden by law or policy. Accordingly, it is essential that all developments of non-lethal weapons be evaluated by appropriate authorities to ensure that they comply with the law of war, U.S. law, and U.S. treaty obligations. Chemical weapons, for instance, must be evaluated in the context of the Chemical Weapons Convention. Some of the most commonly employed non-lethal weapons in the latter half of the 20th century have been chemical riot control agents designed to temporarily incapacitate personnel. New chemical agents may appear which possess characteristics limiting their effects to *countermateriel* use. Such capabilities are without clear legal precedent and will require careful study and evaluation.

Non-lethal weapons must also meet the test of social acceptability. Just as the basic decision to employ military force in defense of national interests is usually a matter of intense public concern, the manner in which that force is exercised is subject to the same scrutiny. As with all weapons we use, the effects of non-lethal weapons must be of such a nature as to be found generally acceptable to our society. In many cases, the same considerations will extend to the larger international community and perhaps the target community as

well. Even though they are designed to minimize fatalities and serious injuries, some non-lethal weapons or their effects might—for religious or cultural reasons—prove so offensive to allies or important neutrals that their use would be counterproductive.

PROVIDE REVERSIBILITY IN COUNTERPERSONNEL EFFECTS

Traditional military weapons act upon targets with indiscriminate effects resulting in crippling injuries and death. Non-lethal weapons should be designed to act in such a way that their effects on personnel will be reversible. (Note, however, that there is no requirement for countermateriel effects to be reversible.) For example, weapons which cause temporary disorientation, passivity, pain, or loss of consciousness could be suitable for consideration under Department of Defense non-lethal weapons development programs.

The preferred mechanism for reversing non-lethal weapons' effects on personnel should be the simple passage of time. In most cases, we would expect the influences of non-lethal weapons to last from a few minutes to a few hours. In keeping with the principle of providing "rheostatic capability," we will develop weapons which allow us to select a "duration of effects." This might be achieved through the employment of capabilities which are safe enough to permit repeated use against the same target with only a negligible increase in the likelihood of causing serious or permanent injuries. Some technologies may allow us to select the duration of personnel effects that can be achieved with a single application.

Some proposed non-lethal capabilities would require the administration of a pharmaceutical or other antidote for the reversal of effects. This imposes a burden on the operational commander by requiring the intervention of medical personnel and the commitment of additional resources. Such capabilities may have some applicability in certain scenarios. Generally, however, their disadvantages outweigh their usefulness.

APPLY ACROSS THE RANGE OF MILITARY OPERATIONS

Military conflicts vary widely in their purpose, character, and intensity--the latter being characterized as low-, mid-, and high-, depending on the nature of combat operations. Non-lethal weapons may prove useful across the range of operations, which

includes both conventional combat operations and the many categories of military operations other than war. We must therefore consider how non-lethal capabilities might be employed in a wide variety of scenarios.

The utility of non-lethal weapons in military operations other than war is widely recognized. For example, in such operations we often find noncombatants involved in acts of violence like rioting or looting. In such circumstances, non-lethal weapons provide commanders an ability to influence the situation favorably with reduced risk of noncombatant casualties and collateral damage.

However, the need to reduce the risks of serious injury to personnel is not limited to crowd control scenarios or to military operations other than war. Tactical applications for non-lethal weapons may exist in any military operation. During military operations on urbanized terrain (MOUT), for example, some of the local civilian populace may remain in an urban area in the midst of battle. The traditional solution to such challenges has been the implementation of restrictive rules of engagement. Non-lethal capabilities offer commanders more flexibility, allowing adoption of less restrictive rules of engagement without necessarily increasing casualties or destruction. Such permissive rules provide subordinates freedom to employ appropriate levels of measured military force to accomplish their missions while minimizing casualties and collateral damage in, for example, urban countersniper operations. Another operation might include a "peace enforcement" mission in which non-lethal weapons are used in an area-denial role. This would allow us to forcibly separate combatants without a counterproductive resort to lethal force. Even in conventional combat operations, non-lethals might be used to capture enemy soldiers for interrogation. A major theater war, though traditionally characterized by the least restraint in the use of lethal means, may also offer opportunities for the application of non-lethal weapons. For instance, it may prove possible to incapacitate or immobilize large enemy concentrations as part of an operational scheme of maneuver.

CORE CAPABILITIES

Core capabilities are those fundamental competencies which enable us to achieve desired operational outcomes. A non-lethal capability provides a flexible means of response in order to

protect friendly forces, to influence the actions of potential adversaries and noncombatants without resorting to lethal force, and to minimize collateral damage. The core capabilities associated with non-lethal weapons fall into two major categories: counterpersonnel and countermateriel.

COUNTERPERSONNEL CAPABILITIES

Non-lethal counterpersonnel capabilities allow the application of military force to accomplish a mission with reduced risk of fatalities or serious casualties among noncombatants—or even, in some instances, among enemy forces. We must explore several specific non-lethal counterpersonnel capabilities. First, we will develop non-lethal capabilities for crowd control. This will include the means to influence the behavior and activities of a *potentially* hostile crowd as well as a rioting mob. While there are many similarities in these two groups, each presents unique challenges. These challenges may require radically different solutions.

Second, we require the capability to incapacitate individual personnel. This capability will provide a means to capture specified individuals, such as those inciting a mob to violence or enemy combatants we seek to take prisoner. Therefore, we will also examine weapons which incapacitate individuals without affecting those nearby. For the purposes of this concept paper, "incapacitation" is achieved when weapon effects result in either physical inability (real or perceived) or mental disinclination to resist or pose a threat to friendly forces. In keeping with the guiding principles for non-lethal weapons, this incapacitation should be readily reversible, preferably self-reversing through the passage of time. This capability may employ some combination of technologies used in other core capabilities—for example, the use of entangling devices that may also be designed for area denial.

Third, we require a non-lethal capability to deny personnel access to an area (land, sea, or air). This can include the use of physical barriers or of systems which cause discomfort to those who enter the denied area. Such non-lethal area-denial technologies would possibly be exempt from some of the restrictions on conventional land or sea mines. This will provide new possibilities for barrier planning in any type of military operation, including mid- or high-intensity conflict.

Fourth, we require a non-lethal capability to clear facilities

and structures of personnel. This capability will facilitate military operations on urbanized terrain (MOUT) by reducing the risks of noncombatant casualties and collateral damage while simultaneously minimizing the advantages accruing to an enemy defending a built-up area.

COUNTERMATERIEL CAPABILITIES

Non-lethal countermateriel capabilities would enhance U.S. operations by reducing or eliminating the enemy's ability to use his equipment. A robust non-lethal countermateriel capability will enable the employment of military force to defuse potentially volatile situations under circumstances in which more destructive conventional military means might prove counterproductive. For example, preemptive strikes against troublesome, aggressive nations may be politically unacceptable when only conventional weapons are involved, with their attendant high risk of personnel casualties. With non-lethal countermateriel capabilities, however, an aggressive nation's ability to threaten its neighbors could be curtailed with far less political risk by attacking only weapons and their supporting infrastructure.

The U.S. military non-lethal weapons approach will focus on two specific countermateriel capabilities. The first is an area-denial capability. We require a non-lethal capability to deny land areas to vehicles. This requirement applies to wheeled, tracked, and surface-effects vehicles. It may include physical barriers, systems that render vehicles temporarily inoperable within the systems' zone of influence, and systems which reduce the trafficability of terrain. It may also be possible to design similar area-denial systems for seaspace and/or airspace. Such systems might be designed to so degrade the responsiveness of sea vessels or aircraft that operators would be reluctant to enter the designated area or find it extremely difficult to deliver ordnance on target. When applied to aircraft, such systems obviously pose a real, but nonetheless significantly reduced, risk of fatalities or serious injuries to pilots and aircrew.

Second, we require a non-lethal capability to disable or neutralize specific types of equipment and facilities. This capability encompasses a wide range of subcategories based on the variety of equipment types to be targeted. There are many technologies to be explored in this area. For example, we may produce systems that alter the combustion properties of fuels, the viscosity of lubricants, or the ability of vehicles to gain

traction. Other technologies may cause the embrittlement or decay of rubber, attacking tires, hoses, gaskets, and insulation. Some countermateriel non-lethals may act as adhesives, gluing doors and hatches shut or tires and tracks to road surfaces. Using chemical, electronic, or acoustical systems, it may be possible to shut down or burn out vehicle, vessel, or aircraft electrical systems or to fuse the metal parts in key equipment without harming its human operators. As with non-lethal area-denial weapons, when applied to aircraft such systems pose a significant, but nonetheless reduced, risk to pilots and other aircrew.

SUMMARY

Throughout history, changes in culture and technology have influenced the character of military force and the manner in which it is employed. In the sense that non-lethal weapons represent an attempt to maximize the utility of military force in a new military and political environment, they represent advances in technology precipitated by a change in culture.

Today, U.S. military forces regularly perform their missions in an operational environment that would have been nearly inconceivable just a few decades ago. In this new environment, firepower and the threat to use it are no longer appropriate solutions to some crises or problems which in the past were considered amenable to a military solution. Senior leaders face a new level of public sensitivity concerning the proper role of military power as an element of national security. Field commanders must respect these sensitivities and seek to achieve the Nation's policy goals through the measured use of military force. Junior leaders must execute the resulting decisions wisely in situations filled with uncertainty and danger.

In the complex and changing modern world, non-lethal capabilities offer an opportunity to *increase* the utility of the military element of national power. A capability to apply measured military force under a variety of tactical circumstances and across the entire spectrum of conflict will provide the flexibility our forces need to successfully adapt to the challenges of the future.

ANNEX A

SCENARIOS FOR NON-LETHAL WEAPONS EMPLOYMENT

While non-lethal weapons do not change the basic nature of military operations, they do add a new dimension by expanding the number of options available to a commander. The following hypothetical scenario explores the potential value of non-lethal weapons, incorporating elements drawn from contemporary operational experience. This scenario is presented as a series of vignettes, each of which involves a different tactical situation, reflecting the range of military operations. It demonstrates the degree to which the increased flexibility provided by non-lethal weapons can enhance operations, permitting the application of *measured military force* under a wide variety of circumstances.

THE SITUATION

The United States has deployed a Joint Task Force to provide humanitarian assistance to a Third World nation. That nation is suffering famine as a result of civil war and anarchy. The operational environment is nonpermissive, uncertain, and chaotic. The capital city, scarred by heavy fighting, is home to several hundred thousand people. The present population is a combination of longtime residents, displaced refugees from rural areas, relief workers, and thousands of armed gunmen whose factions frequently fight pitched battles in the streets as they struggle for control of various neighborhoods.

The tactical situation is unpredictable. U.S. patrols may be met by smiling crowds on one corner and by gunfire on the next. A day later, the situation will be reversed. Attempts to distribute emergency supplies are hazardous. Whenever emergency workers appear, huge crowds invariably gather. Scattered amidst the hungry civilians seeking relief are the armed adherents of various factions. However, many of the armed individuals in the crowd are armed only for their own safety. The people swarm impatiently. Some, including children, dart onto trucks and attempt to steal supplies. Rocks are thrown, sometimes at random, sometimes between factions within the crowd, sometimes at U.S. military personnel and relief workers. There are weapons everywhere. It is impossible to distinguish friends from potential foes.

To add to the complexity of the situation, a neighboring state

has recognized one of the more violent armed factions as the legitimate government. At the invitation of this faction, the neighboring country's army has crossed the border and occupied a long-contested district. The occupiers possess strong conventional military forces, including tanks and artillery. These units have not taken any hostile action against U.S. forces, but have conducted artillery attacks against opposing local factions. They are also supplying weapons and ammunition to local forces in order to influence the outcome of the crisis.

The JTF has set up roadblocks within the capital city and begun aggressive patrolling in order to establish a visible presence. JTF troops emplace strongpoints near key urban terrain, hoping to promote a sense of order and to restore stability in neighborhoods. Other JTF forces provide security and other assistance to nongovernment organizations distributing relief supplies.

The JTF commander has established rules of engagement (ROE) which permit the use of force in self-defense, to protect noncombatants, and to facilitate mission accomplishment. These ROE allow the use of non-lethal weapons when hostile intent is uncertain or to protect noncombatants so long as the use of such weapons does not endanger friendly forces. In all cases, the ROE clearly maintain the right and responsibility to employ deadly force when necessary for individual and unit protection in the face of hostile acts or hostile intent.

MOUT: CASE I

Because the JTF's mission is humanitarian assistance, the commander's policy is to avoid becoming involved in the host nation's internecine warfare unless it threatens U.S. forces, noncombatants, or mission accomplishment. The first challenge to this policy occurs late at night when a pair of rival clans begin a firefight in a crowded neighborhood near a U.S. strongpoint. A few rounds of small arms fire impact near the American position. These appear to be simply stray rounds but it is impossible to be certain. In any event, the ROE clearly permit the use of deadly force in self-defense. However, the noncommissioned officer in charge at the strongpoint knows that the neighborhood is crowded with noncombatants and does not believe that the immediate danger to the U.S. squad justifies returning fire. He contacts higher headquarters and requests assistance.

A reaction platoon quickly arrives on the scene, mounted in

armored personnel carriers (APCs). The platoon commander swiftly assesses the situation and identifies two buildings that appear to harbor gunmen. Two small, unmanned ground vehicles (UGVs) deploy from one of the APCs. These move rapidly into the two buildings, guided by remote control. Once inside, the UGVs employ a non-lethal counterpersonnel weapon that causes almost immediate incapacitation to those exposed. In a few moments, the gunfire sputters, then ceases. Some of the gunmen—as well as several bystanders—become dizzy, weak, and disoriented. Others lose consciousness altogether.

The troops of the reaction platoon dismount and advance toward the buildings in tactical formation and with weapons ready. Once inside, they move quickly from room to room, recovering weapons and using flexible handcuffs to secure all persons suspected of having participated in the firefight. One gunman, who has apparently escaped the effects of the non-lethal weapon, attempts to fire his rifle. A reaction force soldier unhesitatingly shoots him.

Within a few minutes, the effects of the non-lethal weapon begin to wear off. Meanwhile, the reaction platoon collects all suspects and firearms in the street. As the suspects are evacuated to the rear for processing, an APC runs over the weapons, destroying them on the spot. An interpreter accompanying the U.S. troops uses a bullhorn to explain to the local residents what has occurred. He offers medical assistance to anyone who was wounded in the firefight or who might have suffered any ill effects from the non-lethal weapon. A mother brings forward a child with a broken arm, apparently sustained in a fall.

A television crew following the reaction platoon has recorded the entire event. The reporter interviews the reaction platoon's commander, a lieutenant, who acknowledges the regrettable death of one gunman. He stresses, however, that the availability of non-lethal weapons allowed him to quickly stabilize the situation without resorting to a traditional, firepower-intensive, building-clearing procedure which would certainly have resulted in numerous noncombatant casualties. The reporter conjectures that the child's broken arm was probably caused by a fall resulting from the effects of the non-lethal weapon. The lieutenant acknowledges that possibility, but also notes that the child's injuries are relatively minor. He reiterates that, while non-lethal weapons may have resulted in a broken arm, they certainly saved many lives and prevented many potentially crippling wounds.

PREEMPTIVE STRIKE

Within the disputed border region, military forces from the neighboring state continue to consolidate their positions. The member governments of the regional cooperative security organization are divided concerning this neighbor's claim to the disputed territory. Their compromise solution is to issue a nonbinding request that the neighbor withdraw its troops and cease its arms deliveries to the warring factions. This request goes unheeded. Instead, the invading force steps up its military activity, extending patrols beyond the disputed border region into a district soon scheduled to receive relief supplies under U.S. military escort. This increased military activity is accompanied by a propaganda campaign labeling U.S. intervention as "the reckless act of a colonialist bully."

It is not entirely clear, however, that the invading force has any hostile intent with respect to U.S. forces. At best it can be said that the JTF faces a *potentially* hostile force in position to interfere with mission accomplishment. Additionally, the regional cooperative security organization has not demonstrated the will to support U.S. military action. While the JTF is clearly capable of decisively defeating the neighboring nation's forces, the resulting casualties might have unfavorable political repercussions. These might weaken the perceived legitimacy of the U.S. presence and thus threaten both regional support and mission accomplishment.

The JTF commander elects to eliminate the threat of hostile action through a preemptive strike using non-lethal countermateriel weapons. The Joint Force Air Component commander recommends a non-lethal airstrike. Land- and seabased aircraft and UAVs carry out the attack under cover of darkness. As electronic warfare aircraft blind hostile radars, strike aircraft attack large concentrations of vehicles, artillery, and air defense weapons. UAVs engage a number of smaller, outlying positions. The ordnance used affects electrical systems. The strike disables approximately 30 percent of vehicles in the target area and almost all of the mobile electric power generators associated with air defense systems. The potentially hostile force has suffered no personnel casualties but has been rendered operationally immobile and unable to defend itself against further airstrikes, should these prove necessary.

The JTF commander issues a statement to the press describing this non-lethal countermateriel strike. He also expresses his

resolve to apply whatever *measured military force* is necessary in order to protect the JTF, ensure the safety of noncombatants, and prevent interference with mission accomplishment.

RIOT CONTROL

In the neighborhood surrounding the American Embassy, U.S. forces have established roadblocks to prevent the movement of weapons into the area. At these roadblocks, security personnel halt and search all civilian vehicles, confiscating weapons. JTF civil-military relations units have spread the word throughout town that weapons will not be permitted near the Embassy and that those who normally travel armed for their own protection should stay away from that area. The troops manning the roadblocks are prepared for trouble. On a number of occasions, armed gunmen have "tested the system," only to have their weapons confiscated after tense confrontations.

A civilian vehicle approaches a roadblock at higher than normal speed. To security personnel, it appears that the driver does not intend to stop. As the vehicle crashes through the wooden gate, the troops open fire, killing three locals, including a small child. An examination reveals that the vehicle's brakes had failed and that the occupants were an unarmed and innocent family.

As word of the incident spreads, crowds of angry locals begin to gather in the neighborhoods surrounding the Embassy, chanting anti-U.S. slogans. It is evident that while a few are armed, the vast majority are not. At an emergency press conference, reporters challenge the actions of the U.S. troops, asking why non-lethal means were not employed to halt the vehicle. Acknowledging the unfortunate incident and offering sympathy for the victims, the JTF commander reminds the reporters of previous incidents in which U.S. forces sustained casualties under similar circumstances. He explains that the automobile in question had to be considered a threat and that the actions of security personnel were appropriate under the circumstances. He further explains that the JTF will continue to take all reasonable precautions to protect both noncombatants and JTF forces. He notes, however, that the presence of non-lethal weapons in the area of operations cannot guarantee that accidents will never occur in an environment like this one, characterized by danger and uncertainty.

Later, a very large and angry mob surges through roadblocks and gathers in front of the Embassy. A few people hurl rocks at

guards behind the fence, causing no injuries. Then, someone throws two homemade firebombs into the Embassy compound. As guards move to extinguish the flames, an unseen gunman, lost within the huge crowd, fires two shots. A bullet smashes the windshield of a truck parked behind the Embassy fence. In accordance with the established ROE, the guards take cover and immediately return fire using non-lethal weapons: aqueous foams laced with irritants. These have some effect on the nearest rioters but the remainder continue to press toward the compound. A small UAV suddenly appears, swooping low along the street. It drops pepper spray and "stingball" grenades throughout the crowd. A general panic results and the crowd flees the area. Several injured persons are left behind, most of them trampled in the crowd's hasty retreat.

After an hour of relative calm, crowds again begin to gather in the neighborhoods around the Embassy. Intelligence agents report that armed men are attempting to rally their adherents, whipping the people into a frenzy for another assault on the Embassy. Without waiting for the mob to grow, the JTF commander calls for non-lethal weapons to defuse the situation. Soon, a helicopter appears some distance away, well out of the effective range of small arms. Unknown to the gathering crowd, this helicopter mounts a non-lethal counterpersonnel area-denial system with standoff capability. From over a kilometer away, the helicopter crew directs the weapon at the largest groups of would-be rioters. As the system takes effect, the people immediately flee.

Once a state of relative calm has returned, the JTF commander meets with local civil leaders and explains his decision to employ non-lethal capabilities to restore order. He expresses relief that the system succeeded in this instance but warns that further violence, especially when weapons are involved, might require the JTF to use deadly force. The civil leaders agree to spread the word among their people.

MOUT: CASE II

The JTF's presence has caused the armed factions to withdraw from those sections of the city regularly patrolled by U.S. forces. As these groups attempt to establish their dominance in other sections of the city, fighting breaks out and soon reaches major proportions. For the first time since the U.S. deployment, the factions use their heavy weapons systems: howitzers, heavy machine guns, mortars, and even a few older-model tanks. The fighting results in a mounting toll of noncombatant casualties

and significant collateral property damage. In one sector of the city, fire rages out of control. It has already consumed most of a city block.

The National Command Authorities direct the JTF commander to restore order. Thus the mission shifts from humanitarian assistance to peace enforcement. As JTF units approach the embattled sectors of the city, reconnaissance units report that some of the factions are forcibly detaining civilians within their homes. One intelligence report indicates that the factions expect to gain protection from superior U.S. firepower through this ploy. The JTF begins its assault. Despite the radically altered tactical situation, it is not necessary to modify the ROE. Non-lethal weapons remain an important tool for conducting building clearing operations. Lethal force is still authorized at the discretion of local commanders when it is necessary or prudent to ensure adequate force protection or mission accomplishment.

Using standard MOUT tactics, U.S. units isolate a neighborhood and deploy to attack. Several armored personnel carriers mounting unusual antennas take up positions near the JTF's first objective. Two of the vehicles adjust position slightly as the antennas pitch and roll on their mounts, responding to cues from a digital position and direction-finding system. In a few moments, an indicator light flashes on a control panel to show that the antenna array is properly set and the system is ready for operation. A vehicle crewman throws a switch. The system propagates an acoustic energy beam, which the antenna array directs against one of the buildings. The same sighting device that normally serves the vehicle's antitank missile system is connected to the antenna array via computer. As the vehicle commander takes aim through the sight, the antennas adjust their alignment, changing the direction of the beam.

Within a few seconds, the firing slackens and the acoustic energy beam is shut down. Infantrymen dismount from the APCs and maneuver rapidly toward the building. Inside, they find most of the occupants temporarily incapacitated. The noncombatants are huddled together in a few rooms, while the shooters are positioned throughout the building but unable to fire their weapons. The JTF infantrymen evacuate prisoners and captured weapons to the rear. Civil-military relations teams follow up the assault with medical attention for those who have been wounded in the fighting. There are no deaths or injuries attributable to the acoustic energy weapon or to U.S. firepower. Television journalists record the entire event and transmit

their stories in near-real time via satellite.

This scene is repeated several times as the JTF moves from block to block, clearing and securing buildings. The process is not always flawless. Enemy heavy weapons crews, firing from covered positions outside the effective range of the JTF's acoustical systems, have to be taken out with precision-guided munitions (PGMs). Overall, however, the results of the day's action are very satisfying to the JTF commander. The factions have withdrawn, apparently recognizing that the new weapon robs them of the protection they expected to gain by fighting from civilian-occupied buildings in the presence of television cameras. Noncombatant casualties are minimal--far fewer than would normally be expected in a MOUT situation using traditional weapons. Media reaction is very positive. It appears that the journalists have begun to understand that non-lethal weapons are intended to augment, but not *replace*, deadly force.

PEACEKEEPING

The two largest factions have withdrawn to the countryside surrounding the capital city, salvaging many of their heavy weapons. The latter include mortars and a few tanks which once belonged to the now-defunct national army. They have established enclaves in two populated valleys separated by a high, rugged ridgeline running from the country's heavily jungled interior to a point about eight kilometers from the coast. The terrain between the spur of the mountain range and the sea is flat and thickly forested. A coastal highway passes through the area, as do several smaller roads and trails connecting the neighboring valleys now harboring the opposing armed factions. An informal boundary line has been drawn between these armed camps. Although there has been no heavy fighting since the battle in the city, some incidents have occurred as noncombatants attempt to traverse this boundary in search of food or lost relatives. Gunmen have harassed and sometimes killed hapless refugees, causing the rival faction to retaliate. The situation is tense.

The National Command Authorities direct the JTF to maintain peace until such time as a combined regional force operating under the auspices of the U.N. can assume the mission. The JTF commander plans an obstacle and barrier system to assist in controlling movement across the boundary. This economy of force measure will free other forces to continue humanitarian assistance operations. After consulting the JTF staff judge advocate and the engineer officer, the commander elects to emplace a non-lethal barrier system. The use of nonexplosive,

non-lethal barrier devices will mitigate the post-deployment hazards associated with traditional mines.

The system includes a combination of old and new technologies. Traditional barbed wire marks the line and serves as a deterrent to the merely curious. Where roads cross the boundary, JTF troops man checkpoints. Each of these checkpoints includes a hardened strongpoint armed with conventional antiarmor and antipersonnel weapons. At all other points along the boundary where the warring factions might be tempted to infiltrate vehicles, engineers emplace automated systems that dispense a variety of "vehicle stoppers." Upon the approach of an unauthorized vehicle, these can be activated by either remote command or an automatic sensing device. These weapons are nontoxic and "environmentally friendly." The barrier system also includes non-lethal counterpersonnel devices. Like the vehicle stoppers, these can be activated by command or automatically activated by sophisticated sensors programmed to detect human presence. These systems use a combination of effects, emplaced in "layers" starting with pepper spray and entangling devices and escalating to non-lethal directed-energy weapons. Intruders who attempt to infiltrate through this "rheostatic" barrier will encounter a series of personnel effects of ever-increasing intensity. Most important, the entire obstacle belt is kept under continuous observation through a combination of patrols, observation posts, and sensors. It is also covered by conventional lethal weapons, just like a traditional obstacle system. The factions are advised that any attempt to force the barrier will be met by overwhelming firepower.

Following the installation of the barrier, the factions conduct probes, attempting to infiltrate small groups of armed men. Most turn back after encountering the initial layers of non-lethal counterpersonnel devices. In one instance, however, a squad-sized group presses on and attempts to destroy one of the directed-energy transmitters within the obstacle belt. A JTF reaction force counterattacks immediately, killing two gunmen and wounding three. Attempts to penetrate the barrier soon cease.

MARITIME INTERCEPTION

The boundary between the factional territories ends at the sea. When the barrier system proves effective in halting infiltration by land, the factions attempt to circumvent it using seaborne infiltration. Off the coast, U.S. naval forces support the peacekeeping effort by boarding and inspecting suspicious

vessels in order to prevent such infiltration.

Most of the local coastal traffic consists of slow fishing vessels which naval patrol craft easily monitor and board. One of the factions, however, has acquired two very fast commercial speedboats. At night, one of these boats attempts a high-speed run from a river outlet, moving rapidly along the coast toward the coastal portion of the opposing faction's enclave. U.S. naval units detect the boat and immediately determine that due to its very high speed patrol craft will not be able to overhail it prior to its arrival near the opposing faction's enclave. A destroyer launches a UAV which flies an intercept course under remote guidance. The UAV's onboard sensors soon detect and lock on to the boat. An operator onboard the destroyer then remotely activates a "vessel stopper" system on the UAV causing the boat's engine to die. As the boat drifts, a U.S. patrol craft arrives. An interpreter orders the occupants of the boat to prepare to receive a boarding party. The American sailors confiscate several weapons, arrest the boat's crew and passengers, and rig it for towing back to the capital city's port.

CONCLUSION

The above vignettes depict the uncertainty inherent in war and in the conduct of military operations other than war. In the scenario, non-lethal weapons enhanced the core combat capabilities of U.S. troops by bridging the gap between *threats* and *deadly force*. This added capability created a complete continuum of force from which commanders and troops could select appropriate effects. The tactical flexibility thus achieved ensured that concerns for public and media reaction, mission accomplishment, force protection, and the safety of noncombatants remained in balance.